Shell Exploration & Production

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Re: Request to Terminate Shell Arctic OCS Permits

EPA issued the following three air quality permits to Shell companies in November 2011:

- Outer Continental Shelf Prevention of Significant Deterioration Permit to Construct No. R10OCS/PSD-AK-09-01 for the Noble Discoverer drillship in the Chukchi Sea, issued September 19, 2011 (Discoverer Chukchi PSD).

- Outer Continental Shelf Prevention of Significant Deterioration Permit to Construct No. R10OCS/PSD-AK-2010-01 for the Noble Discoverer drillship in the Beaufort Sea, issued September 19, 2011 (Discoverer Beaufort PSD).

- Permit to Construct and Title V Air Quality Operating Permit No. R10OCS030000 for the Conical Drilling Unit Kulluk, issued October 21, 2011 (Kulluk Title V).

This letter acknowledges that the Discoverer Beaufort PSD permit has expired and asks EPA to terminate the Discoverer Chukchi PSD and Kulluk Title V permits.

Discoverer Beaufort PSD Permit Expiration

Shell acknowledges that the Discoverer Beaufort PSD permit has expired. Condition A.7 ("Expiration of Approval to Construct") states that the approval "becomes invalid if construction is not commenced within 18 months after the effective date of this permit." Because Shell did not commence construction by the Discoverer becoming an OCS source in the Beaufort Sea within 18 months of the permit effective date, the permit expired on its terms. As result, since approximately July 28, 2013 Shell has no longer been authorized by EPA under this permit to construct or operate the Discoverer in the Beaufort Sea, nor since that time has Shell had any remaining obligations or requirements under the permit.

Termination Request for Discoverer Chukchi PSD and Kulluk Title V Permits

Shell operated in 2012 under the Discoverer Chukchi PSD and Kulluk Title V permits (the EPA Permits). This past February, Shell announced a pause in its exploration drilling activity in the Arctic OCS to prepare equipment and plans for a resumption of activity at a later stage, and so is not operating under the EPA Permits in 2013. Given this decision and the fact that Congress transferred Arctic OCS air permitting authority from EPA to the Department of Interior (DOI)[1], Shell has determined that this is the best time to

[1] Consolidated Appropriations Act, 2012, Public Law 112-74, Dec. 11, 2011. As the DOI BOEM website states: "The Consolidated Appropriations Act, 2012, effectively transferred jurisdiction to regulate air emissions associated with oil and gas activities on portions of the Alaska OCS from EPA to BOEM. Companies seeking to operate facilities on the Chukchi Sea OCS

obtain approvals from DOI for its future Arctic OCS operations. Shell, therefore, does not intend to conduct any further operations under the EPA Permits, so is asking EPA to terminate them.

Shell's operating experience in 2012 revealed significant issues with limits and conditions in the EPA Permits. As reflected in Discoverer Chukchi PSD permit revision requests submitted by Shell in June and November 2012 and February 2013, many limits and conditions in that permit would need to be changed to allow Shell to operate in compliance in the future. If Shell were to continue to use the EPA Permits, in the unlikely event the Kulluk were used, it is very likely that revisions to its' Title V permit would also be necessary, as well as additional revisions to the Discoverer Chukchi PSD permit not covered by the existing revision requests.

There are several general reasons why extensive permit revisions would be needed. These include the fact that: (1) many limits in the EPA Permits were necessarily based on various assumptions because there were no available direct data on controlling emissions during actual drilling operations in the Arctic OCS and no opportunity to test the vessels in the Arctic in drilling mode before setting the limits; (2) 2012 operating experience revealed that the fluctuating engine loads encountered in actual operation did not match well with emission limits based on emissions testing conducted at constant and relatively high engine loads, (3) there were issues with the control equipment in relation to startups and changing engine load; and (4) some engines operated at loads so low that there were issues with exhaust temperatures being sufficient for complete control device effectiveness.

For these reasons, Shell submitted several revision requests for the Discoverer Chukchi PSD permit, which included the following:

- New NO_X emission limits and elimination of ammonia limits for the Discoverer's D399 main generator engines. Testing demonstrated that the originally permitted NO_X limits are not feasible, and actual operating experience further informed the need for even less stringent NO_X limits, given issues related to the ability of the controls to respond fast enough to the frequent changes in operating load that occur during drilling operations.

- Revisions to reflect the fact that Shell installed more-costly and better-performing catalytic diesel particulate filters (CDPFs) on some engines in place of oxidation catalysts, including revisions to require appropriate monitoring, record-keeping, and reporting requirements.

- Revisions to the requirement to test at rated capacity because the Discoverer generator engines and many of the engines on the Associated Fleet vessels are unable to operate at their rated capacity due to various operational/contractual limitations. Testing needs to be conducted at each engine's maximum feasible operating rate.

- Revisions to the PM_{10} and $PM_{2.5}$ emission limits for the oil spill response vessel based on testing showing that the vessel's PM emissions are higher than were assumed during the permit process.

- Revisions to take into account the fact that engines are cold before startup and take time for exhaust to reach the elevated operating temperatures required for catalytic controls to operate effectively. Operating experience demonstrated that it is physically impossible for the control technology to meet permit limits during startup periods.

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and/or Beaufort Sea OCS no longer require an air permit from the EPA." http://www.boem.gov/About-BOEM/BOEM-Regions/Alaska-Region/Index.aspx.

- Revisions to increase the hourly NO_X mass emission limits for the crane and cementing unit engines and to eliminate the hourly duty cycle restriction, which was based on the assumption of even distribution of the daily fuel limit, which proved not to be the case in actual operation. These revisions would be necessary to accommodate the highly variable duty cycle of these engines during drilling operations.

- Revisions to remove the requirement to use CDPFs on crane, cementing unit, hydraulic power unit, and mud line cellar engines due to issues related to the effectiveness of the control technology on low load units. Actual operating experience showed that these engines operated at loads that were too low to maintain exhaust gas temperatures to allow emissions control by catalytic controls to work effectively, making CDPFs an infeasible control technology for these engine applications. These revisions would require updated modeling and possibly impact conditions related to incinerator operations.

As Shell has further analyzed its 2012 operating experience and continued work with Noble to improve the Discoverer drillship, it has identified the following additional permit revisions that would or might be required for future operations:

- The propulsion engines in the Noble Discoverer drillship have been replaced. Based on its 2012 operating experience, Shell has determined that the propulsion engines must be available for some use during anchoring; something that the current permit prohibits. The permit would need to be revised, based on modeling and an updated emissions inventory, to allow for some propulsion engine use during anchoring and impose appropriate limits.

- Replacement of the Discoverer power generation engines is underway, which would require a significant permit revision, including a BACT review.

- For future operations Shell will in all likelihood need to add a new vessel to the Associated Fleet to support the new EPA General NPDES permit by monitoring discharges. This would require evaluating and adding the vessel's emissions to ambient impact evaluations under the permit and revisions to include any appropriate limits for the vessel.

- Further changes to vessels in the Associated Fleet are possible, given that many of the vessels are leased and availability can change. Depending on the type and control status of emitting units onboard different vessels, new or different emission limits might be necessary.

Although Shell has not submitted to EPA a request to revise conditions in the Kulluk Title V permit, many of the limits and conditions that are problematic for emission units in the Discoverer Chukchi PSD permit are similarly problematic for units in the Kulluk Title V permit and would likely require revision in the unlikely event that permit were to be used again in the future. These include:

- Revisions to allow for startup periods to allow catalytic emissions controls to reach the elevated operating temperatures required for those controls to operate effectively.

- Revisions to remove the requirement to use CDPFs on crane, cementing unit, hydraulic power unit, and mud line cellar engines because the controls are ineffective on low load units.

- Potential changes to vessels used in the Associated Fleet.

In addition, 2012 operating experience demonstrated other issues with the permit going forward:

- Revise upwards aggregate NO_X limit for Seldom Used Sources (K-7A through K-7D5) to accommodate actual operating conditions, which would have to be based on updated air dispersion modeling.

- Revision to replace the requirement to operate within 90 percent of the most recent inlet temperature with a set inlet temperature.

- Revisions that might be warranted due to damage sustained in the December 2012 maritime incident.

Conclusion

The EPA Permits would require extensive and substantial revisions to allow Shell to conduct a safe, effective, and compliant Arctic OCS exploratory drilling program in future seasons. If Shell was to submit its full revision request packages, in some respects they would be akin to new permit applications, incorporating new modeling analyses and control technology evaluations. Given that Congress has transferred the authority to authorize emissions from Arctic OCS exploratory drilling operations from EPA to DOI, and the significant extent of revisions required to make the existing EPA Permits useable for Shell, now is the right time for Shell to obtain authorizations from DOI for all future operations, as any other company now seeking Arctic OCS exploratory drilling approval will have to do. This would also reduce the potential for conflicting air permit regimes that could resultantly be in effect for different drill vessels in the same theatre should Shell continue its' exploratory drilling program in future years without this action.

Shell appreciates EPA's significant efforts to issue the permits that authorized Shell's operations in 2012. We recognize that the process presented unique challenges and required significant Agency resources. The experience gained during the 2012 season will allow Shell to substantiate more appropriate operational conditions through the DOI process. Despite some of the difficulties Shell faced in 2012, the company is proud of its record. Compared with other OCS exploration programs of which Shell is aware, Shell's 2012 Arctic season was subject to an unprecedented level of emission limit stringency, data monitoring and reporting requirements, and other compliance obligations. As the lists above show, in some cases those limits proved to be more stringent than warranted. Nonetheless, Shell is confident that its efforts to minimize adverse air quality impacts and to comply with the EPA Permits are unmatched in OCS exploration history. Shell will remain similarly committed to protecting air quality in the Arctic as it pursues future air quality authorizations through DOI.

Thank you,

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cc: Chris Lindsey, Shell
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